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ABSTRACT

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TEEN OUT-OF-WEDLOCK BIRTHS AND WELFARE RECEIPT: THE ROLE OF CHILDHOOD EVENTS AND ECONOMIC CIRCUMSTANCES

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Abstract

Using 20 years of longitudinal data on nearly 900 children aged 0 to 6 in 1968 (19 to 25 in 1987) from the University of Michigan's Panel Study of Income Dynamics, the authors measure the influence of family background, individual characteristics, economic resources (or the lack thereof), and the experience of particular disruptive family events on the probability that a teenager will give birth out of wedlock and subsequently apply for and receive welfare. The prior welfare participation of a teenage daughter's mother is an important focus in the analysis, which employs a bivariate probit model. Among the many findings of the investigators is that teenage daughters whose mothers have more education are less likely to give birth out of wedlock, that teens whose mothers received welfare are more likely to give birth out of wedlock and receive welfare themselves, and that teens who grew up in a home experiencing stressful events (e.g., parental separation, geographic moves) are more likely to give birth out of wedlock.

TEEN OUT-OF-WEDLOCK BIRTHS AND WELFARE RECEIPT: THE ROLE OF CHILDHOOD EVENTS AND ECONOMIC CIRCUMSTANCES

In 1990 nearly 700,000 teenage girls (one out of about every 12) became pregnant out of wedlock, and half of them carried the pregnancy to term. Soon after giving birth, most of these girls applied for and were awarded AFDC benefits. Indeed, three out of four recipients of AFDC benefits who are under age 30 first gave birth as a teenager, in most cases out of wedlock. About $20 billion is paid annually through AFDC, food stamps, and Medicaid to women who are or were teenage mothers. Each family that began with a birth to a teenager will cost the public an average of about $14,000 over the next 20 years (Trussell, 1988). In addition to welfare dependency, a wide variety of other dysfunctional consequences are associated with teen fertility out of wedlock--rapid subsequent fertility, low educational attainment, poor marriage prospects, high rates of marital dissolution, and a high incidence of poverty.

This problem is far more serious among blacks than among whites. For example, while the birth rate among white teens stands at 43 per 1000 females, the black teen birth rate is 90 (Moore, 1989). Teen births account for about 23 percent of all births to black women and about 11 percent of births to white women. Moreover, births to unwed mothers account for about 90 percent of births to black teenagers, compared to about 50 percent for whites.

In the research reported here, we employ a 20-year data set on 892 young women aged 19 to 25 in 1987. Our objective is to measure the influence of family background, individual characteristics, the availability of economic resources while growing up, and the experience of particular disruptive family events while growing up on the probability of both teen out-of-wedlock births and the receipt of AFDC benefits subsequent to such births. The framework that we employ

attempts to measure the rather close tie between the decisions to give birth out of wedlock and to apply for and receive welfare benefits.

I. SOME THEORETICAL CONSIDERATIONS

Less well known than the existence and extensiveness of the teen out-of-wedlock birth phenomenon is its relationship to either the characteristics of those teens experiencing nonmarital births, the characteristics of the families in which they have grown up, or other factors such as welfare benefits or employment opportunities that may be causal to this behavior. Nonetheless, speculations concerning the determinants of out-of-wedlock teenage births abound.

The role of the welfare system is probably the linkage about which most has been written. Growing up in a welfare family--and, hence, a mother-only family--is thought by some to have a demonstration effect, hence the numerous claims regarding "intergenerational welfare dependency." The lifestyle of welfare mothers--often characterized by unstable relationships with males, dependence on government support for economic livelihood, the absence of work, and the presence of children often born out of wedlock--may be seen by daughters as acceptable, if not ideal, and in any case generally not frowned upon in the families, communities, or neighborhoods in which they grow up.

Information problems and the lack of connections have also been suggested as causal to the phenomenon. Children from poor or welfare families, it is hypothesized, are either poorly informed about labor market opportunities (at least relative to information about welfare and other nonwork options), or lack the connections essential for market success even if they have information. Again, poverty and welfare recipiency are seen as the source of this absence of information and connections, and as a result young women who have grown up in poor or welfare families tend to relatively undervalue opportunities in the labor market that may be an alternative to childbearing. The linkage

here involves a rational choice among options, albeit one based on erroneous or asymmetrical information.

A third connection, one based on sociological insights, has also been suggested. Stressful and unsettling events during childhood or early youth--for example, divorce or separation of parents or changes in household location--may stimulate feelings of insecurity that can be assuaged by the "possession" of something, someone, who counts, who stays, and who provides love and affection. When these events are compounded by the hopelessness which comes with growing up in poverty, and the uncertainty that surrounds the prospects for and stability of employment for young (often, minority) males who might be potential mates, the desire for the security that comes with motherhood is even stronger. Delayed marriage and nonmarital parenthood are the result.

A final potential linkage is more economic in character. The decision of a teenage unwed woman regarding childbearing may be made so as to maximize her well-being in both the short and long runs. Having a child out of wedlock gives access to welfare income, social services, and job-specific education and training, as well as to the potential benefits which they convey. Perhaps as important, it provides independence from life in a family situation which may be oppressive--that is, it provides the excuse, if not the resources, to establish an independent living arrangement. The costs, on the other hand, may not be perceived as great, and include sustenance costs (some portion of which are covered by public benefits), child care costs (which may be small if parents, grandparents, or other relatives are accessible), and the foregone earnings from those jobs for which the teenage girl may qualify. These costs, in any case, may be offset by reductions in the obligation for continued attendance at traditional schools (with the potential discipline, failure, and boredom correlates), by not having to work in those unpleasant jobs available to youths with low skills, by increases in feelings of worth and security (noted above), and by the opportunity to form a "community" with other young women in like circumstances. Out of this comes the teen unmarried woman's demand for children--

her well-being will be maximized, given the expected benefits from having a child, the costs of securing it and raising it, and her budget constraint (which differs between the two options), constrained of course by her aptitudes and aspirations.

In addition to these hypotheses, empirical research in sociology has suggested the importance of a number of other variables. The number of siblings, for example, has been hypothesized to be a determinant of adolescent fertility. Large family size is associated with overcrowding and low income, and because parental time has to be distributed more widely, there is probably less interaction and communication between parents and children when more siblings are present. Neighborhood characteristics have also been cited as affecting the life experiences of young people. Areas that are either disproportionately populated by female-headed families, that have a high ratio of teenagers to adults, or that have high crime or drug-use incidence rates may indicate low parental control over children's behavior and activities.

II. LITERATURE REVIEW

Research on the determinants of teenage out-of-wedlock fertility is found primarily in the sociology and demography literatures. A good starting point is the important article by Hogan and Kitagawa (1985), which reviews much of the preceding literature in this field. Even more recent reviews are those by Hayes (1987) and Hofferth and Hayes (1987).

The ethnographic research on the determinants of teen out-of-wedlock births tends to search for relations among important variables through detailed observation of and interviews with relatively small numbers of individuals, nonrandomly chosen and typically in a single community. As Hogan and Kitigawa (1985) report, this research suggests that teenage women who are black, who live in lower socioeconomic-class families or in neighborhoods characterized by instability in employment among male youths, who have grown up in large mother-only families, and who have sisters who

have given birth out of wedlock are more likely to achieve adult status th
hrough teenage motherhood
than those with different characteristics. The demographic research cite
d by Hogan and Kitagawa is
described as largely having ignored "the impact of family factors, social
l and economic characteristics,
and neighborhood influences" (p. 832), in part because the survey data u
used tend to be too crude to
adequately describe the personal, family, and neighborhood circumstanc
es that effect the decisions of
teenagers.

In their own study, Hogan and Kitagawa use a stratified random
n sample of more than 1000
black teenage females in Chicago in 1979. Using a variety of statistical
l methods involving numerous
control variables, they found that pregnancy rates in this sample were p
ositively related to having
parents who were not married, the number of siblings, low social-class
family status, low parental
control of dating, having a sister who is a teenage mother, and having l
low career aspirations. While
living in a low-quality neighborhood had a gross positive relationship to
o teen fertility, it was found to
have been mediated by parental control over early dating patterns.

More recently, Antel (1988) has used data from the 1979-86 N
ational Longitudinal Survey of
Youth (NLSY) to analyze the determinants of out-of-wedlock births pri
ior to age 21. His model
attempts to control for possible unobserved family-specific heterogeneit
ty by simultaneously modeling
the daughter's fertility outcome and the mother's prior welfare particip
ation in a bivariate probit
specification. Exogenous variables explaining the daughter's fertility in
include race, family socio-
economic status, proxies for the tastes for children, attitudes toward ea
arly motherhood, and mother's
welfare status. Mother's welfare status depends on variables reflecting
g opportunities in both the labor
and "welfare" markets, age, number of children, and nonlabor income.
e. Antel finds that "a mother's
dependency thus appears to stimulate her daughter's early fertility out
of wedlock" (p. 17), and does
so in a nontrivial way. Minority status, the education of the mother, t
the number of siblings, and

socioeconomic status were also found to be related in a statistically significant and expected manner to out-of-wedlock births among teenagers.

A study by Plotnick (1988) also addresses the determinants of teenage out-of-wedlock childbearing, again using the NLSY data on the fertility and marital history of teenage girls, in this case from 1979 to 1984. To the personal and family background data in this survey Plotnick adds state information on welfare policy, family planning policy and service availability, and the socio-economic environment (for which four characteristics of the girl's school serve as proxies). Logit estimates over the groups of blacks, Hispanics, and whites indicate that the determinants of teen childbearing out of wedlock differs substantially among them, a finding of a number of other studies on this issue. Of the basic demographic and other variables, none is statistically significant for all three groups. Contrary to other empirical work (e.g., Ellwood and Bane [1985]), Plotnick finds that the size of the welfare guarantee does have a significant positive effect for whites and Hispanics, increasing the probability of out-of-wedlock births. Welfare generosity is not significant for blacks.

In an extension of this work, Plotnick and Lundberg (1990) follow the fertility and marital history of a sample of about 1700 teenage girls (aged 14 to 16 in 1979) in the NLSY from 1979 to 1986. Using a three-stage nested logit framework, they model the sequential decisions of teenage pregnancy and its possible outcomes--abortion, birth within marriage, and out-of-wedlock birth. The independent variables of interest include economic determinants--the opportunity cost of carrying to term (within marriage it is the potential wage loss; out of wedlock it is the wage loss less the welfare guarantee, measured as the expected AFDC cash benefit plus food stamps)--and variables serving as proxies for psychic well-being in the alternative states. State abortion policies (including program funding levels) are included in the model as well. Plotnick and Lundberg find that the level of welfare benefits is positively and significantly related to the probability of teen out-of-wedlock births for whites (a finding consistent with Plotnick's [1988]) and that welfare benefits are not significantly

related to out-of-wedlock births for blacks (consistent with Duncan and Hoffman's [1989; see below] and Plotnick's [1988]). State funding of abortions is found to significantly influence the probability of an abortion for whites, while long-run opportunity costs of giving birth as a teen also significantly influence the probability of pregnancy and abortion among whites.

Three other recent studies deserve to be mentioned. Duncan and Hoffman (1989) use data on black teenagers from the Michigan Panel Study of Income Dynamics and also explicitly model teenage out-of-wedlock births as a rational decision. In their framework, a choice is made by the teenager, who compares the welfare income opportunities associated with giving birth out of wedlock with the income opportunities that are likely if there is no such birth (namely, the opportunities offered by a career and possible marriage). Like Plotnick, Plotnick and Lundberg, and Ellwood and Bane, Duncan and Hoffman find only weak and statistically insignificant effects of the level of welfare benefits, but strong effects related to income expectations if a birth does not occur.

A second study, that by Abrahamse, Morrison, and Waite (1988), uses data from the High School and Beyond survey to follow a large sample of high school sophomores as they mature through the years up to age 19, comparing the ones who form single-parent families with those who do not. A variety of background factors were analyzed in an attempt to discern which of them (or which constellation of them) appeared to cause some women to be more predisposed to become single teenage parents than others. Using both simple relationships and multivariate analysis, the authors concluded that a constructed "parenthood risk scale" (reflecting race, academic ability, family structure, and socioeconomic status) had a major effect on the likelihood of teen out-of-wedlock births, but that various forms of parental control or interactions, religiosity, peer group attitudes, and individual attitudes could alter the risk substantially, for both women in the high "parenthood risk" category and those in the low risk category. Most important, evidence in this study indicated that the

effect of the high and low risk categories on the chances that a teen becomes a single mother differs among the black, white, and Hispanic populations.

This same pattern of differential risks between blacks and whites, and different effects of background variables on the risk of unmarried motherhood, was found in a study by Bumpass and McLanahan (1989). Using data from the 1982 National Survey of Family Growth on women 15 to 44 years of age, the authors first estimated the effect of race, growing up in a single-parent family, parental education, region, and central-city residence on the risk of a nonmarital birth. Parental education and growing up in a single-parent family had large and statistically significant effects, and overall the nonrace characteristics explained about one-third of the racial differences in the risk of single motherhood. Estimating the models separately for blacks and whites resulted in the same general patterns of risk factors, but the magnitude of the effects differed between the races. Grouping factors so as to form "high risk" (women from disrupted families, whose parents did not complete high school, and who lived in central cities in the Northeast) and "low risk" categories helped explain a very large proportion of the variation among women in terms of the probability of experiencing a nonmarital birth. For example, white women in the high risk category had a 52 percent chance of experiencing a nonmarital birth, while women in the low risk category had but a 5 percent chance. For blacks the chances were 82 and 32 percent in the two risk categories. It should be noted again, however, that the results from this research pertain to nonmarital births for all women aged 15 to 44, and not only for those in their teens.

A number of important findings concerning the correlates and determinants of teen out-of-wedlock births seem firm from these studies. These include (1) the importance of racial differences in the prevalence of teen nonmarital births, even after controlling for a variety of socioeconomic, attitude, family circumstance, neighborhood, and urban-rural factors; (2) the importance of a variety of "risk" factors (growing up in a disrupted family, having parents with low levels of educational

attainment, living in central cities, close parental supervision, and having a sibling who is a single childbearer), in addition to race and ethnicity; and (3) the uncertain effects of a number of important and oft speculated variables on this outcome, including the generosity and lenience of welfare programs and the welfare participation and work status of the mother of the teen woman when she was growing up.

While a number of these findings seem relatively robust over the studies, a variety of weaknesses pervade the methods and data on which the studies rest. Few of the studies rely on longitudinal data, and hence are unable to detect the effect of events and circumstances early in a girl's life on the probability that she will experience a teen nonmarital birth. Even for those studies that have a longitudinal dimension, only prior events and circumstances after age 14 are typically recorded in the data. The methods of the studies vary widely, and hence the comparability and reliability of their results are difficult to assess. The extent to which relevant family background characteristics are included in the data on which the estimates rest varies widely; for some of the studies the number of relevant characteristics is quite limited. Finally, some of the studies are based on rather dated information, a factor which is particularly relevant in this area where behavioral patterns appear to be changing rapidly.

As suggested above, the decision to receive welfare benefits is linked to the decision to give birth out of wedlock. Indeed, Duncan and Hoffman (1989) report that in their sample of black teenage unwed mothers, two-thirds of those that chose to give birth out of wedlock received AFDC income within two years of the birth. The empirical estimates of the determinants of welfare receipt are numerous and often focus on the extent to which welfare participation is intergenerationally transmitted--are daughters who grew up in families which receive welfare benefits more likely themselves to receive public assistance? Because our study also sheds light on this question (for teenage nonwed mothers), we briefly examine the findings in this literature as well.

Since the receipt of AFDC benefits presupposes either an out-of-wedlock birth or a divorce after childbearing, most of the studies examine similar factors. The participation in welfare of the mother of the teenage girl is the primary variable of interest in many of these studies. Typically, mother's participation is measured over a specified and limited period of time (a two- to three-year window), and a similar limited period is observed for the daughter once she leaves home. These studies include Antel (1988) and Duncan, Hill, and Hoffman (1988). The studies tend to show a weak but positive dependence of the daughter's receipt of welfare benefits on the mother's earlier welfare participation.

Gottschalk's 1990 paper critiques this research strategy, and suggests that (1) the period (or window) of observation time in these studies is too short, and (2) some mothers are never eligible for welfare (and hence should be excluded from the study). Both of these weaknesses, he concludes, lead to biased estimates of the strength of the intergenerational transmission relationship. The former factor leads to a downward bias in the estimate, the latter to an upward bias. In his empirical work, Gottschalk uses the NLSY for 1979 to 1985 for daughters 14 to 22 in the beginning year. While the window of observation is not a problem for the daughters, Gottschalk still faces a limited set of years over which mothers' welfare participation is observed. Using a sample of about 900 daughters who grew up in families eligible for AFDC benefits and a longer period of observation on daughters than was available in prior studies, he examines the relationship between the mother's welfare participation and the probability that a teenage daughter experiences a nonmarital birth and (conditional on this birth) receives AFDC benefits. He finds this relationship to be positive and significant for blacks and whites, but not Hispanics.

III. A SEQUENTIAL DECISION MODEL

This study builds on previous research on the determinants of both teenage out-of-wedlock births and the receipt of AFDC benefits. Its focus is the population of unmarried teenage women, and its objective is to model their decision to give birth as unwed teenagers and then, conditional on having given such a birth, to apply for and receive AFDC benefits. The potential role of the prior welfare participation of the mothers of these young women will be an important focus, as will other economic circumstances and the characteristics of the families in which they have grown up.

The structure of the model that we estimate attempts to characterize correctly the nature of the decisions confronting unwed teenage girls and reflects the fact that the decision to receive welfare benefits is conditional on having carried a pregnancy to term. Hence, the basic question that we pose is similar to that explored in Duncan and Hoffman (1989). However, we avoid the potential misspecification associated with identically treating teenage girls who give birth out of wedlock but do not receive welfare benefits and teenage girls who do not give birth (and have no basis for welfare receipt), modeling the behavior of the two as if they were a single homogenous group. Hence, we explicitly investigate why some teenagers who give birth out of wedlock choose to receive welfare benefits while others do not.

In this sequential model, the first decision confronting the unwed teenager is whether to give birth; the second decision is whether or not to receive welfare benefits conditional on having had a child. This formulation has several advantages. First, by separating the out-of-wedlock fertility decision from the welfare receipt decision, the various determinants of each of these choices can be analyzed. Second, by separating the two choices, we can test the importance of available AFDC benefits in the decision to give birth out of wedlock as a teenager. Finally, by correcting for selection bias while treating the choices as part of a simultaneous model, a consistent estimate of the determinants of welfare receipt by these women can be had.

Our econometric model has the following simultaneous equation system:

(1) $I_1^* = Z_1\gamma_1 + K\delta_1 + \epsilon_1$ — Teen out-of-wedlock birth decision

(2) $I_2^* = Z_2\gamma_2 + K\delta_2 + \epsilon_2$ — AFDC receipt decision

where I_1^* is the choice of giving birth out of wedlock as a teenager and I_2^* is the choice of receiving AFDC benefits subsequent to giving birth out of wedlock as a teenager.

(3) $K = W\Phi + e_1$

(4)
$$I_1 = \begin{cases} 1 \text{ if } I_1^* > 0 & \text{[Giving birth out of wedlock as a teen]} \\ 0 \text{ otherwise} & \text{[Not giving birth out of wedlock as a teen]} \end{cases}$$

(5)
$$I_2 = \begin{cases} 1 \text{ if } I_2^* > 0 \text{ and } I_1 = 1 & \text{[Giving birth out of wedlock as a teen and receiving AFDC]} \\ 0 \text{ if } I_2^* \le 0 \text{ and } I_1 = 1 & \text{[Giving birth out of wedlock as a teen and not receiving AFDC]} \end{cases}$$

By normalization, $V(\epsilon_1) = V(\epsilon_2) = 1$. Then, the covariance matrix between (1) and (2) is given by

$$\Sigma = \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix}$$

The Z vector contains exogenous variables that are expected to influence the choices I_1 and I_2. The variable K in (3) is also used as an explanatory variable in the two decision equations. K includes

any variable that might cause simultaneity bias if it were used in the decision equation without having its own equation. For example, the average level of income of the girl's family relative to its needs seems to be correlated to both ϵ_1 and ϵ_2, so we use the instrumental variable method for correcting the resulting bias. This specification of K will provide the necessary flexibility to enable us to perform the empirical analysis of the determinants of teen fertility out of wedlock and subsequent AFDC recipiency.

Under selection rules (4) and (5), the probability P_j that the individual will fall into the jth subsample is given by

(6) $$P_1 = Pr(I_1 = 0) = Pr(I_1^* \leq 0)$$

$$= Pr(e_1 \leq -Z_1\gamma_1 - K\delta_1) = 1 - F(Z_1\gamma_1 + K\delta_1)$$

(7) $$P_2 = Pr(I_2 = 0) = Pr(I_1^* > 0, I_2^* \leq 0)$$

$$= Pr(e_1 > -Z_1\gamma_1 - K\delta_1,\ e_2 \leq -Z_2\gamma_2 - K\delta_2)$$

$$= G(Z_1\gamma_1 + K\delta_1,\ -Z_2\gamma_2 - K\delta_2\ ;\ \rho)$$

(8) $$P_3 = Pr(I_2 = 1) = Pr(I_1^* > 0,\ I_2^* > 0)$$

$$= Pr(e_1 > -Z_1\gamma_1 - K\delta_1,\ e_2 > -Z_2\gamma_2 - K\delta_2)$$

$$= G(Z_1\gamma_1 + K\delta_1,\ Z_2\gamma_2 + K\delta_2\ ;\ \rho)$$

where F() and G() denote the standardized univariate and bivariate normal distribution functions, respectively.

We can partition the original sample into three mutually exclusive subsamples:

S_1: those who do not give birth out of wedlock as a teen;

S_2: those who give birth out of wedlock as a teen, but do not receive AFDC benefits; and

S_3: those who give birth out of wedlock as a teen and receive AFDC benefits.

The likelihood function for the entire sample has the following form:

$$(9) \qquad L = \prod_{S_1} [1 - F(Z_1\gamma_1 + K\delta_1)] \cdot \prod_{S_2} G(Z_1\gamma_1 + K\delta_1, -Z_2\gamma_2 - K\delta_1 : \rho)$$

$$\cdot \prod_{S_3} G(Z_1\gamma_1 + K\delta_1, Z_2\gamma_2 + K\delta_2 : \rho)$$

The estimable parameters of this model are γ_1, γ_2, δ_1, δ_2, and ρ. The maximization of (9) with respect to γ_1, γ_2, δ_1, δ_2, and ρ will yield consistent estimates $\hat{\gamma}_1$, $\hat{\gamma}_2$, $\hat{\delta}_1$, $\hat{\delta}_2$, and $\hat{\rho}$.

This model is fit by full information maximum likelihood techniques and proceeds in two stages. In the first stage, we fit an ordinary least squares equation describing the level of economic circumstances of the family in which the young woman grew up. The average income-to-needs ratio, measured as the average of the level of posttransfer family income divided by the poverty line of the girl's family when she was between 6 and 15 years old, is used as the indicator of the economic resources that were available to her when she was a child. The literature, and we, refer to this as the "welfare ratio." The second stage, fit by maximum likelihood techniques, is a bivariate probit model estimating, first, whether or not the girl was observed to experience an out-of-wedlock birth during her teenage years (ages 13 to 18);[1] and second, if an out-of-wedlock birth was observed, whether or not the girl received AFDC benefits at any time within the subsequent three postfertility years.

IV. DATA, VARIABLES, AND ESTIMATION METHODS

The basic sample of observations used for the analysis comes from the 1987 tape (wave 20) of the University of Michigan's Panel Study of Income Dynamics (PSID). The individuals selected from that tape are females aged 6 years or less in 1968. In 1987, then, the ages of the women in the sample ranged from 19 to 25. Hence, the individuals in the sample were children during most of the period of observation, but by the terminal year had passed through virtually all of the teenage years.

Of the 912 observations that meet our criteria for inclusion in the sample, 20 had two or more years of missing information. These observations were discarded. Those observations with but one year of missing data (15) were retained, and the missing data were filled in largely by averaging the data for the two years contiguous to the year of missing information. This left 892 in our sample.

To enable individual observations with different birth years to be compared, all of the time indexes were transformed from the year of the survey to the age of the individual. Hence, for two individuals aged 2 and 6 in 1968, for example, we obtain comparable information on each from age 6 until age 18 by using the data on the 1972-1984 waves for the first child and the data on the 1968-1980 waves for the second. For monetary data, all dollar values were converted to 1976 prices using the Consumer Price Index.

Our first-stage ordinary least squares regression has as its dependent variable the welfare ratio (total annual income divided by the official poverty line for that year) of the family in which the girl lived, averaged over the years during which she was 6 to 15 years old. The dependent variable in the teen out-of-wedlock birth equation is a dummy variable equaling 1 if the girl gave birth out of wedlock between the ages of 13 and 18; the dependent variable for the receipt of AFDC benefits subsequent to a teen out-of-wedlock birth equation is a dummy variable equaling 1 if the teen mother received AFDC benefits in any of the three years after giving birth out of wedlock. We run the estimates over our entire sample and for racial subgroups; we also test for differences between the

random observations and the SEO sample observations to account for the oversampling in the PSID of low-income persons.

Determination of the receipt of AFDC benefits in the PSID is difficult due to both the lack of individual data related to transfer recipiency and to the lack of accuracy in distinguishing transfer income from various programs. Our measurement of AFDC recipiency is based on responses to several questions in the survey:

- Type of transfer income from individual responses = TYPE
- Relationship of the individual to the household head = RELHEAD
- Head and wife's AFDC income = HWAFDC
- Head and wife's other welfare benefits = HWOWE

If TYPE is AFDC only, other welfare only, or both in any of the three years after the girl experienced a teen out-of-wedlock birth, the girl is assumed to be an AFDC recipient. In addition, if RELHEAD is "head," "wife," "child," or "grandchild," and either HWAFDC or HWOWE is positive, the girl is assumed to be an AFDC recipient.[2]

In our sample of 892 girls, 130 (14.6 percent) gave birth out of wedlock while a teenager and 762 (85.4 percent) did not. Of the 130 girls experiencing a teen out-of-wedlock birth, 91 (70 percent) received welfare within the subsequent three years and 39 (30 percent) did not. Among the 437 black girls in our sample, 105 (24 percent) experienced a teen out-of-wedlock birth by age 18. Of these, 74 (70 percent) received welfare within three years. For 874 black girls aged 15 to 19 in the PSID, Duncan and Hoffman (1989) found that 66 percent (unweighted) did not experience a teen out-of-wedlock birth. Of the 295 girls that experienced an out-of-wedlock birth in that sample, 68 percent received AFDC benefits in the subsequent two years.

We group the independent variables employed in our analysis into four categories: (1) demographic and background information on the child and her parents; (2) measures of the economic

circumstances of the family while the child was between the ages of 6 and 15; (3) indicators of family stress during childhood; and (4) indicators of economic conditions in the geographic area of residence. For the family stress variables, we coded the variables for each year, assigning a value of 1 if the event occurred in that year and 0 otherwise.

Basic Background Variables (Weighted means and standard deviations in parentheses)

- Race (black = 1), $\overline{X}$ = .49 (.16); σ = .50 (1.59)
- Religion (dummy variables for Protestant, Catholic, and Jewish, with Other being the excluded category, or a single dummy variable for any religion = 1) Catholic, $\overline{X}$ = .19 (.28); σ = .39 (1.97); Protestant, $\overline{X}$ = .73 (.60); σ = .44 (2.14); Jewish, $\overline{X}$ = .01 (.02); σ = .10 (.66)
- Number of siblings, $\overline{X}$ = 2.60 (2.13); σ = 1.64 (6.45)
- Mother's age at first birth, $\overline{X}$ = 22.0 (22.5); σ = 5.0 (22.5)
- Father's education[3] (dummy variables for completing high school, some college, and college graduate, with less than high school being the excluded category) Dad high school graduate, $\overline{X}$ = .23 (.30); σ = .42 (2.0); Dad some college, $\overline{X}$ = .08 (.13); σ = .28 (1.49); Dad college graduate, $\overline{X}$ = .10 (.19); σ = .30 (1.71)
- Mother's education[4] (defined in the same way as the father's education with an alternative dummy variable for high school graduate which includes those with more education) Mom high school, $\overline{X}$ = .28 (.46); σ = .49 (2.18); Mom some college, $\overline{X}$ = .08 (.11); σ = .27 (1.42); Mom college graduate, $\overline{X}$ = .04 (.07); σ = .19 (1.10); Mom high school graduate, $\overline{X}$ = .50 (.65); σ = .50 (2.09)
- One parent in 1968 (only one parent present in 1968, hence no education variable is available for father), $\overline{X}$ = .18 (.08); σ = .38 (1.22)

• No parents in 1968 (no parents present in 1968, hence no education variable is available for mother or father), $\overline{X}$ = .04 (.01); σ = .19 (.53)

• Head foreign born (foreign born = 1), $\overline{X}$ = .02 (.02); σ = .13 (.66)

• Years lived in SMSA (lived in urban area in that year = 1), $\overline{X}$ = 7.20 (6.92); σ = 4.26 (18.95)

• Grandparents poor (head's parents were poor while head grew up =1), $\overline{X}$ = .54 (.45); σ = .50 (2.18)

• Years head disabled (limited in ability to work because of health) while the daughter was between the ages of 6 and 15 (limited = 1), $\overline{X}$ = 1.73 (1.13); σ = 2.75 (9.76)

• Years lived in South (lived in the South in that year while the daughter was between 6 and 15 years old = 1), $\overline{X}$ = 4.71 (2.86); σ = 4.94 (19.5)

• Mom out-of-wedlock birth, $\overline{X}$ = .17 (.09); σ= .38 (1.22)

• Split off from family, $\overline{X}$ = .33 (.32); σ = .47 (2.02)

• Lost grade level (= 0 if the daughter completed 12th grade at age 18), $\overline{X}$ = .17 (.16); σ = .56 (1.8)

• Control for missing grade, $\overline{X}$ = .09 (.08); σ = .29 (1.17)

• Occupation of head in the year daughter gave birth (1 = professional, managerial, 2 = white-collar, 3 = high-skill blue-collar, 4 = low-skill blue-collar, 5 = unemployed), $\overline{X}$ = 3.17 (2.7); σ = 1.43 (6.2)

• Dummy variable for having lived in South while the daughter was between the ages of 14 and 17, $\overline{X}$ = .48 (.30); σ = .50 (2.00)

<u>Economic and Family Stress Variables</u>

• Average income-to-needs (welfare) ratio (= average of family income for each year the daughter was between 6 and 15 years old divided by the matched poverty line), $\overline{X}$ = 2.33 (3.13);

σ = 1.8 (9.18)

• Parental welfare recipiency (= 1 if the daughter lived in a family that received benefits from the Aid to Families with Dependent Children program in any year until she was 15), $\overline{X}$ = .29 (.17); σ = .46 (1.66)

• Receipt of AFDC benefits by a mother before the daughter gave birth (= 1 if mother a recipient), $\overline{X}$ = .58 (.49); σ = .50 (1.67), defined over 130 daughters who experienced a teen out-of-wedlock birth

• Years living with one parent (= 1 if daughter lived with one parent in that year while she was between 6 and 15 years old), $\overline{X}$ = 2.85 (1.76); σ = 3.97 (14.0)

• Number of household moves (= 1 if a change in household location is made by the family of the daughter in that year while she was between 6 and 15 years old), $\overline{X}$ = 1.51 (1.76); σ = 1.72 (13.96)

• Number of parental separations (= 1 if the parents of the daughter separated or divorced in that year while she was between 6 and 15 years old), $\overline{X}$ = .26 (.27); σ = .49 (2.19)

• Parental remarriages (= 1 if the parent of the daughter remarried while she was between the ages of 6 and 15), $\overline{X}$ = .13 (.13); σ = .34 (1.49)

Community Economic and State Welfare Generosity Variables

• Bad neighborhood in 1976 (= 1 if replies that either [1] burglaries and robberies, [2] muggings, rapes, pushers, junkies, or too few police, [3] crowded area with too many people, too much noise, and bad traffic, [4] a poor neighborhood for kids, or [5] unkept yards, grounds, houses poorly kept up, or infrequent or sloppy garbage pickups are "a big problem"), $\overline{X}$ = .48 (.37); σ = .50 (2.11)

• Median income, county of residence year in 1974, $\overline{X}$ = 9402 (9887); σ = 2164 (9964)

• Average unemployment rate, county of residence, ages 6 to 15, $\overline{X}$ = 6.30 (6.35); σ = 1.65 (7.68)

• Maximum AFDC benefits and food stamp benefits, plus average Medicaid expenditures, for a family of four, in state of residence,[5] ages 6 to 15, in 1982 personal consumption expenditure (PCE) dollars, $\overline{X}$ = 605.95 (630.53); σ = 134.8 (591.5)

In the estimates, we totaled the number of times each time-related event occurred in the child's family from age 6 to age 15. Variables for time-related events include years lived with one parent, number of household moves, number of parental separations, years head disabled, and years living in SMSA. The state maximum AFDC benefits, the food stamp benefit, and the Medicaid expenditures variable used in the estimates are averages over relevant years. In the welfare ratio equation and the teen out-of-wedlock birth equation, the average is taken for the years the child was between 6 and 15; for the receipt of AFDC benefits by the teen mother, the value is for the year of the birth of the child. For this last group, the average AFDC maximum benefit is $527, with the standard deviation being $111; the weighted average is $557, standard deviation $371.

V. ESTIMATES FROM THE SEQUENTIAL MODEL

In the estimates below we view the decisions made by a girl as sequential decisions; hence, the decision to receive welfare benefits subsequent to an out-of-wedlock birth is made after the birth occurs, and the girls making the decision are a select group from the entire sample of young women. Both the sequential nature of the decision process and the selectivity process affecting the sample of women for whom the choice is relevant are reflected in the model. Moreover, because the factors that determine the income-to-needs ratio of the family in which the girl grows up are likely to be the same factors that influence both the girl's fertility and subsequent welfare recipiency decisions, an

instrumental variable estimate of the family's average income-to-needs (welfare) ratio is entered in the fertility and subsequent welfare receipt equations.

In Table 1, we present the ordinary least squares estimates of the determinants of the average welfare ratio of the family in which the girl grew up. The signs of the estimated coefficients are as expected, and most of the relevant variables are statistically significant.

In terms of background variables, the education of the girl's parents, especially her father's, shows the expected positive association. Race (black) has the expected negative sign and is also significant. The other included background variables also have the expected and significant associations--negative for poor grandparents, head foreign born, and years head was disabled; positive for years lived in an urban area (with high costs of living), negative for years in South (with generally lower wage rates and costs of living). The negative coefficient on number of siblings suggests that even after using an equivalence scale, larger families have less income relative to needs than do smaller families (or that the equivalence scale does not adequately capture economies of scale). For the family stress variable, years with one parent has the expected negative (and significant) association. County median income--measured in a single year--has a positive but not quite significant association, reflecting its being a rather poor measurement of neighborhood income. The county unemployment rate--measured during the years the girl was between 6 and 15--has the expected negative sign but is also not significant. Finally, state welfare generosity is positive and significant. This variable may also serve as a proxy for relative wealth, income, and the cost of living of a state.

Table 2 shows the maximum likelihood estimates for the teen out-of-wedlock birth and subsequent welfare receipt equations, estimated sequentially in a bivariate probit model. The variable representing the economic resources available to the girl while she was growing up--the average welfare ratio--is entered as a predicted value from the estimated equation shown in Table 1. As

Table 1

Ordinary Least Squares Regression Estimates of
the Determinants of Family Welfare Ratio
(N=892)

	Coefficient	T-Statistic
Background variables		
Race (black = 1)	-0.36	-3.06*
Religion		
Catholic	0.39	2.12*
Protestant	0.10	0.64
Jewish	2.89	6.38*
Number of siblings	-0.25	-8.95*
Parents' education		
Dad high school graduate	0.36	2.96*
Dad some college	1.16	6.42*
Dad college graduate	1.58	8.45*
Mom high school	0.19	1.86**
Mom some college	-0.15	-0.86
Mom college graduate	0.78	3.02*
One parent in 1968	-0.14	-0.91
No parents in 1968	0.12	0.50
Head foreign born	-0.50	-1.52
Years lived in SMSA	0.03	2.15*
Grandparents poor	-0.14	-1.54
Years head disabled	-0.06	-3.49*
Years lived in South	-0.02	-1.88**
Economic and family stress variables		
Years living with one parent	-0.07	-4.49*
Community economic and state welfare generosity variables		
Median income, county of residence	0.04^{-3}	1.52
Unemployment rate of county	-0.03	-1.08
Maximum AFDC benefits, food stamp benefits, and Medicaid expenditures in state of residence	0.001	2.41*
Constant	2.18	4.97*
R-squared	0.55	

Source: Computations by authors based on data from the 1968-87 tapes of the University of Michigan's Panel Study of Income Dynamics.

* Statistically significant at the 5% level.
** Statistically significant at the 10% level.

Table 2

Bivariate Probit Model Estimates of How Selected Variables Affect the Likelihood of Teen Out-of-Wedlock Births and Receipt of Welfare Benefits Conditional on an Out-of-Wedlock Birth

	Out-of-Wedlock Births (N=892)		Receipt of Welfare Benefits (N=130)	
	Coefficient	T-Statistic	Coefficient	T-Statistic
Background variables				
Race (black = 1)	0.42	2.11*	0.24	0.60
Religion	-0.40	-2.06*		
Number of siblings	0.06	1.18		
Mother's age at first birth	-0.01	-0.54	-0.01	-0.56
Mom high school graduate	-0.61	-3.57*	-0.15	-0.40
Years lived in SMSA	0.03	1.81**		
Mom out-of-wedlock birth	0.83	0.85		
Lived in South between age 14 and 17			-0.59	-1.84**
Split off from family			0.05	0.28
Lost a grade level			0.27	1.10
Control for missing grade			0.05	0.18
Occupation of head			0.10	1.14
Economic and family stress variables				
Predicted welfare ratio	-0.16	-1.09	-0.51	-2.30*
Parental welfare recipiency[a]	0.15	0.97	0.46	1.82**
Household moves	0.06	1.50	0.11	2.06*
Parental separations	0.49	3.55*		
Parental remarriages	-0.48	-2.15*		
Community economic and state welfare generosity variables				
Bad neighborhood in 1976	-0.04	-0.86		
Unemployment rate of county	-0.006	-0.14		
State welfare generosity[b]	0.0004	0.77	-0.0004	-0.40
Constant	-0.05	-1.60	-0.17	-0.19
Rho	0.85	4.73*		
Log-likelihood	-357.55			

Source: Computations by authors based on data from the 1968-87 tapes of the University of Michigan's Panel Study of Income Dynamics.

[a] Measured over ages 6 through 15 in out-of-wedlock birth equation but from age 6 until daughter gave birth in recipiency equation.
[b] Measured over ages 6 through 15 in out-of-wedlock birth equation but at age when daughter gave birth in recipiency equation.

* Statistically significant at the 5% level.
** Statistically significant at the 10% level.

expected, the predicted average welfare ratio has a negative (though not significant) relationship to the out-of-wedlock birth outcome. The variables that are significant (or nearly significant, in the case of household moves) include all three included family stress variables, with the expected signs: positive for disruptive events such as family geographical moves and parental separations and divorce, and negative for parental remarriages. Mother's education is also significant, with the expected negative relationship, while race--being black--has a large positive and significant relationship. Having a religion is negatively and significantly related to experiencing a teen out-of-wedlock birth. None of the community variables (including welfare generosity) are significant, and the bad neighborhood variable has an unexpected negative sign. A measure of opportunity cost--the county unemployment rate--is not at all significant, while living in an urban area (which may serve as a proxy for the degree of stigma costs associated with a teen nonmarital birth and/or tastes) has a positive and significant association with the probability of a teen out-of-wedlock birth. The variable indicating whether or not the teen's mother experienced an out-of-wedlock birth is positive but not significant. Similarly, whether the parents of the teen received AFDC benefits while the daughter was growing up is not significant. The number of siblings, another possible taste factor as well as an indicator of parental time spent with the child, has a positive association with early nonmarital fertility, though it is not significant (t-statistic = 1.18).

The results for receipt of welfare benefits conditional on having a teen out-of-wedlock birth are generally as expected, and several of the coefficients are statistically significant. As expected, the predicted average welfare ratio has a negative and significant relationship with the teen's receipt of welfare (t-statistic = 2.3). Being black has a positive relationship with welfare recipiency, but is not at all significant. Other significant variables are whether the teen lived in the South, parental welfare recipiency, and household moves. Living in the South between the ages of 14 and 17 is negatively associated with the receipt of welfare benefits, reflecting in part the significantly lower AFDC

benefits in those states. The receipt of welfare benefits by the teen's parents (primarily, her mother) while she was growing up has a large positive and significant (at the 10 percent but not the 5 percent level) relationship with the teen's receipt of welfare, providing support to the "intergenerational welfare recipiency" conjecture. Geographical relocation and the stress associated with moves is positively and significantly associated with the receipt of welfare. The age of the mother of the teen when she first gave birth is negatively associated with the probability of the receipt of welfare benefits by the teen daughter, but is not significant. Similarly, a number of variables expected to be associated with the receipt of welfare--loss of a grade in school, having independent living status, and the status of the occupation of the family head--have the expected positive sign but are not significant. Finally, mother's education shows the expected negative association with welfare recipiency, but has no statistical significance. The variable included to test for the role of the generosity of welfare benefits is not at all significant and has an unexpected negative sign. Inclusion of the living in the South variable is one explanation for this result.

These estimates are derived using a bivariate probit model. The test for the simultaneity of the model is positive and significant (t-statistic = 4.73), providing evidence in favor of this simultaneous specification of the model which treats the decisions as sequential--first, the probability of giving birth out of wedlock as a teen and second, conditional on giving such a birth, whether to apply for and receive welfare benefits.[6] The model works well in predicting teen out-of-wedlock births. While the actual percentage who gave birth out of wedlock as a teen is .146, our model applied to individual data predicts an identical average probability (see Table 3). The model also accurately predicts the receipt of benefits. The actual percentage receiving benefits (among those experiencing a teen out-of-wedlock birth) is .70; our predicted average probability after correcting for selectivity is .69 (again, see Table 3).

VI. SIMULATED IMPACTS OF INDEPENDENT VARIABLES

Table 3 estimates the effect of the independent variables on both teen nonmarital birth decisions and the subsequent decision to receive AFDC benefits. The variables selected are those which might be responsive to policy: welfare generosity, geographic moves, parental separations, reduced poverty, and increased mother's education.

Increasing the educational attainment of parents would appear to have an important effect in reducing the prevalence of teen out-of-wedlock births. We estimate that if all mothers of these teenage girls had completed high school, the probability that their daughters would experience a teen out-of-wedlock birth would be reduced by 46 percent; the probability that their daughters would, subsequent to giving birth, receive welfare benefits is reduced by 18 percent. These estimates should be interpreted cautiously, as they neglect the unmeasured factors which explain school completion. They do, however, suggest important payoffs from increasing one's education, beyond those of higher market productivity and wages. Alternatively, having a mother who received welfare benefits at some point while the daughter was between 6 and 15 years old (or until the daughter's fertility, in the receipt equation) increases both the probability of a teen out-of-wedlock birth and the probability of applying for and/or receiving welfare benefits.

Increasing income via (1) increasing the predicted welfare ratio by 20 percent or (2) eliminating poverty (increasing all predicted welfare ratios below one to one) shows a small negative influence on both teen out-of-wedlock births and receipt of welfare benefits conditional on such a birth. In all cases the elasticity is small--but negative. Increasing income via increasing welfare generosity works instead to increase the likelihood of both teen out-of-wedlock births and the recipiency of welfare benefits. Our point estimate is that a 20 percent increase in welfare generosity across all states would increase the probability of teen births by nearly as much as 16 percent and

Table 3

Simulated Impacts of Independent Variables on the Likelihood of Teen Out-of-Wedlock Births and Receipt of Welfare Benefits Conditional on an Out-of-Wedlock Birth

	Teen Out-of-Wedlock Birth		Receipt of Welfare Benefits	
	Probability	Percentage Change from Base	Probability	Percentage Change from Base
Base	0.146		0.693	
20% increase in predicted welfare ratio	0.137[a]	-6.2	0.637	-8.0
Eliminate poverty	0.142[a]	-2.6	0.663	-4.3
All moms are high school graduates	0.078	-46.3	0.567[a]	-18.1
20% increase in state welfare benefits	0.169[a]	+15.9	0.771[a]	+11.4
One additional household move	0.157	+7.8	0.733	+5.8
One household move fewer	0.138	-5.8	0.661	-4.5
One additional parental separation	0.255	+74.4		
One parental separation fewer	0.121	-17.1		
Parents receive AFDC	0.161[a]	+10.3	0.777	+12.2

Source: Computations by authors based on data from the 1968-87 tapes of the University of Michigan's Panel Study of Income Dynamics.

[a] Simulation estimates based on t-statistics less than 1.5.

receipt by about 11 percent. (These should be interpreted cautiously, for the coefficients are not statistically significant.)

Another variable that shows a major impact on the probability of a teen out-of-wedlock birth is parental separation. Our simulations suggest that if all parents of the teenage girls in the sample were to separate an additional time while the daughter is between 6 and 15 years old, the probability that their daughter would experience a teenage out-of-wedlock birth goes up by nearly 75 percent! The reverse--a reduction in separations by one--has a much smaller influence, since only families that had at least one separation are affected by the reduction. Finally, geographic moves are predicted to influence the probability of both teen out-of-wedlock births and the receipt of welfare benefits, although the magnitude is small. The effect of increasing moves by one is about an 8 percent increase in the probability of a teen experiencing an out-of-wedlock birth and a 6 percent increase in the probability of welfare receipt, conditional on giving birth out of wedlock.

These simulations suggest then a substantial response of teen nonmarital fertility and welfare receipt behavior to changes in economic circumstances, family stress, and parental education.

VII. CONCLUSIONS

In this paper we present bivariate probit estimates of the correlates of teen nonmarital births and welfare recipiency for our sample of young women. Controlling for the large number of determinants included in the model, we estimate that being black is positively associated with the probability of a teen nonmarital birth. This is consistent with prior research and suggests that the model be run separately for nonblacks and blacks. However, in testing our sample for differences between nonblacks and blacks, we cannot reject the hypothesis that the subsamples were structurally the same, even at the 20 percent confidence level.[7]

The negative sign of the predicted average income-to-needs ratio of the family in which the girl was raised indicates that the teen out-of-wedlock birth decision is associated with the economic status of the family, even when a substantial number of other variables are controlled for. Parental education, which is itself an important determinant of the economic status of the family, is one of these important control variables. The educational background of the mothers of the young women in our sample is negatively and significantly related to the probability that their offspring will experience an out-of-wedlock birth. The sign for the religion variable is negative and significant, a result also consistent with those in other literature. The number of siblings of the teen is positively but not significantly related to the chances that she will experience a nonmarital birth.

The variables indicating stress in the family--separation/divorce, remarriage, and change in geographic location--all have a large and statistically significant effect (except for moves) on the probability that a teen will give birth out of wedlock, and the signs are all as expected. Those family changes indicating disintegration or dislocation tend to increase the probability of experiencing a birth out of wedlock as a teenager, and the variable suggesting restabilization (the remarriage of a single mother or father) reduces the probability of experiencing a nonmarital birth. A girl who lived in a family which ever received AFDC benefits (between the time she was 6 and 15 years old) has a higher probability of experiencing a teen out-of-wedlock birth, but the variable is not significant. The generosity of the welfare benefits in the state in which the girl resided while she was growing up has a positive sign, but is also not statistically significant.

Our estimates of the determinants of the probability that a teen who has given birth out of wedlock will receive AFDC benefits subsequent to giving birth suggest that being black increases the probability; however, it is not significant. The income of the family in which the girl grew up has a negative effect on the probability that she will choose to go on welfare, and it is significant. A measure of wealth--the prestige of the head of household's job--has the expected positive sign but is

not significant. We find evidence that having a mother who has received AFDC benefits before the daughter gave birth increases the probability that the nonmarried daughter will choose welfare recipiency. The generosity of the welfare benefits in the state that the girl resides shows no relationship to her being a welfare recipient, but the coefficient on a variable for living in the South, the region that has the lowest welfare benefits in the nation, is negative and statistically significant. The family stress variable, geographic moves, is positively related to the probability that the girl will choose welfare recipiency and is statistically significant. Finally, variables indicating whether the teen mother separated from her parents and whether she lost a grade in school have the expected positive signs but are not significant.

These simulations highlight the potentially important role of parental education and separations in influencing teenage behavior. They suggest that policies that are successful in reducing the incidence of female high school noncompletion could reduce the teen out-of-wedlock birth rate for the next cohort of young women. Finally, they suggest that parental separations and geographic moves appear to create family-based stresses that may increase the likelihood of teenage out-of-wedlock births--even after controlling for income, race, region, years lived with one parent, and parents' education.

Notes

[1]Only 12 females in the sample gave birth prior to age 15 (only one prior to age 14).

[2]We thank Greg Duncan for helping us in defining this variable.

[3]The parents' education and religion variables were measured in 1968, the first year for which this information was available on PSID files. At this date, the children's ages ranged from 0 to 6 years. The questions were asked of the current family head and wife. In most cases information was obtained from the child's parents, but in some cases the information would describe a stepparent or other family member. If the child lived in a single-parent home in 1968 (usually female-headed), there would be no information for the second parent. A dummy variable, one parent = 1, was created and assigned to these observations. If the child lived with grandparents or other nonparents in 1968, and no information is available on either parent, a dummy variable, no parents = 1, was created and assigned.

[4]We thank Robert Moffitt and Peter Gottschalk for making these available to us.

[5]Again, we thank Robert Moffitt and Peter Gottschalk for making these available to us.

[6]Estimating two separate probit equations, one for out-of-wedlock births on the entire sample and one for welfare recipiency conditional on such a birth (N = 130), shows generally similar results. The exceptions in the out-of-wedlock birth equation are (1) number of siblings is positive and significant (t-statistic = 1.67); (2) the actual welfare ratio is used and is negative and statistically significant (t-statistic = 2.09); and (3) geographic moves are positive and significant (t-statistic = 1.70). For the recipiency equation the exceptions generally are reduced t-statistics. The similar pattern reassures us of the robustness of our results.

[7]We also attempted to run this test for the SEO and random subsamples. We had difficulty obtaining convergence of the random subsample, but a slightly modified specification suggested we

could not reject the hypothesis of identical structures at the 1 percent confidence level, but could at the 5 percent level.

References

Abrahamse, A., Morrison, P., and Waite, L. 1988. "Beyond Stereotypes: Who Becomes a Single Teenage Mother?" Rand Corporation, January.

Antel, J. 1988. "Mother's Welfare Dependency Effects on Daughter's Early Fertility and Fertility Out of Wedlock." Unpublished paper, University of Houston, May.

Bumpass, L. and McLanahan, S. 1989. "Unmarried Motherhood: Recent Trends, Composition, and Black-White Differences." Demography 26(2): 279-286.

Cutright, P. and Smith, H. 1988. "Intermediate Determinants of Racial Differences in 1980 U. S. Nonmarital Fertility Rates." Family Planning Perspectives 20(3): 119-123.

Danziger, S. 1986. "Breaking the Chains: From Teenage Girls to Welfare Mothers or, Can Social Policy Increase Options?" In Ladders Out of Poverty, J. Meyer, ed. Washington, D.C.: American Horizons Foundation.

Duncan, G., Hill, M., and Hoffman, S. 1988. "Welfare Dependence within and across Generations." Science 231: 467-471.

Duncan, G. and Hoffman, S. 1989. "Welfare Benefits, Economic Opportunities and the Incidence of Out-of-Wedlock Births among Black Teenage Girls." Unpublished paper, University of Michigan.

Ellwood, D. and Bane, M. J. 1985. "The Impact of AFDC on Family Structure and Living Arrangements." Pp. 137-207 in Research in Labor Economics, R. Ehrenberg, ed. Greenwich, Conn.: Jai Press.

Gottschalk, P. 1990. "The Intergenerational Transmission of Welfare Participation: Facts and Possible Causes." Unpublished manuscript.

Hayes, C., ed. 1987. Risking the Future: Adolescent Sexuality, Pregnancy and Childbearing. Vol. 1. Washington, D.C.: National Academy Press.

Hofferth, S. and Hayes, C., eds. 1987. Risking the Future: Adolescent Sexuality, Pregnancy and Childbearing. Vol. 2. Washington, D.C.: National Academy Press.

Hogan, D. and Kitagawa, E. 1985. "The Impact of Social Status, Family Structure, and Neighborhood on the Fertility of Black Adolescents." American Journal of Sociology 90(4): 825-855.

Krein, S. F. 1986. "Growing up in a Single-Parent Family: The Effect on Education and Earnings of Young Men." Family Relations (January).

Krein, S. F. and Beller, A. 1988. "Educational Attainment of Children from Single-Parent Families: Differences by Exposure, Gender, and Race." Demography 25: 221-234.

Marino, C. and McCowan, R. 1976. "The Effects of Parent Absence on Children. Child Study Journal 6(3): 165-182.

McLanahan, S. 1985. "Family Structure and the Reproduction of Poverty." American Journal of Sociology 90(4): 873-901.

Moore, K. 1989. "Facts at a Glance." Washington, D.C.: Child Trends, Inc.

Mott, F. and Haurin, R. J. 1988. "Linkages Between Sexual Activity and Alcohol and Drug Use Among American Adolescents." Family Planning Perspectives 20(3): 119-123.

Plotnick, R. 1988. "Determinants of Teenage Out-of-Wedlock Childbearing: Evidence from the National Longitudinal Survey of Youth." Unpublished paper, University of Washington, Seattle, May.

Plotnick, R. and Lundberg, S. 1990. "Testing the Opportunity Cost Theory of Premarital Childbearing." Paper presented at the APPAM meetings, October.

Trussell, J. 1988. "Teenage Pregnancy in the United States." Family Planning Perspectives 20(6): 262-272.

U. S. Department of Commerce. 1989. Statistical Abstract of the United States, 1989. Washington, D.C.: U. S. Government Printing Office.